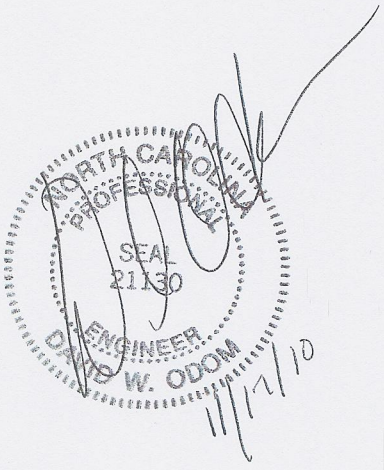
PRELIMINARY ENGINEERING REPORT

Cliffside Sanitary District Study Project 2010

Prepared for:

Rutherford County / Cliffside Sanitary District

October 22, 2010



Prepared by:

Odom & Associates Engineering, Inc.
152 East Main Street
Forest City, North Carolina 28043

TABLE OF CONTENTS

APPENDICES

I. EXECUTIVE SUMMARY

The Cliffside Sanitary District (CSD), formed in the 1970's primarily to serve three large textile facilities and the surrounding community. Due to the closure of the textile facilities in 2005, CSD is experiencing both challenging financial and operational conditions. To help the CSD operate, Rutherford County is supplementing its funding by approximately $60,000 per year. Even with this supplement, CSD is challenged to meet its monthly obligations and has no resources to complete needed repairs. To address these challenges, Rutherford County and CSD jointly obtained funding from the North Carolina Rural Center to determine a strategy for the long-term management and operation of the system. Odom & Associates Engineering was hired to complete this Preliminary Engineering Report (PER) in order to evaluate the options available for CSD's continued operation.

This PER includes the following information:

A. A GIS map of the sewer collection system showing MH's, line sizes, etc.
B. Smoke testing results of the sewer collection system in conjunction with the N.C. Rural Water Association.
C. Flow monitoring at various locations in order to track Inflow & Infiltration.
D. Evaluation of CSD management and boundaries.
E. Recommendation of repairs to the existing collection system and lift stations.
F. Evaluation of options for the long-term discharge of the wastewater, including modification of the existing plant, installation of a package plant and a cost/distance comparison of pumping to the Town of Boiling Springs or the Town of Forest City.
G. Recommendation of a budget based upon the completion of boundary modifications and the modification of the electrical service to the existing plant.

It is the recommendation of this report that the Cliffside Sanitary District in conjunction with Rutherford County complete the following tasks:

IMMEDIATE ACTIONS

1. Seek to modify the electrical service to the wastewater treatment plant. This modification should result in an annual savings of approximately $25,000 per year. Estimated Cost - $0-$7500.
2. Upon confirmation of the annual savings from the electric service modification, replace the effluent flow meter at the plant. Estimated Cost - $5000.
3. Begin taking steps to modify the District Boundaries to the recommended boundaries shown in Appendix E. These recommended boundaries include all customers currently served by the District or who have access to the system. Should this not be successful, a separate rate structure should be established for outside customers to offset the potential revenue loss due to the District boundaries not being expanded.

LONGER TERM ACTIONS

1. Identify potential board members who live in the new District Boundaries. Evaluate the feasibility of modifying the charter to allow all property owners within the District Boundaries to serve as Board Members.
2. Seek funding from various sources for the following items:

a.	Gravity Sewer Line Replacement	-	$1,425,000
b.	Bridge Lift Station Modification	-	$215,000
c.	Wastewater Treatment Plant Modification	-	$425,000
	Recommended Funding to Obtain	-	$2,065,000

II. BACKGROUND

The Cliffside Sanitary District was formed in the early 1970's. Up until that time, Cone Mills, a textile manufacturing facility, located in the Cliffside community, owned and operated a water treatment plant, a water distribution system and a sewer collection system. These systems primarily served the mill but also provided service to the surrounding mill village. Cone Mills owned three separate manufacturing facilities served by the utilities at this time; the old Cliffside Mill which was originally built in the late 1800's; the Haynes Plant which was built in the 1940's; and the Weave Plant which was built in 1974. At the time, sewage and processed water was discharged directly into the Second Broad River. Anticipating the Clean Water Act of 1974, Cone Mills pursued the formation of a Sanitary District to own and operate the water and sewer utility systems. They viewed the formation of the District as a way to access federal funding for the construction of a wastewater treatment plant as well as a means of limiting their current and future liability. Cone Mills transferred its water treatment plant and water distribution system and its wastewater collection system to the newly formed CSD. To ensure the District had sufficient interest in operating and managing its utility systems, Cone Mills encouraged senior members of its management team to seek election as Commissioners of the District. A 1.75 million gallons per day (MGD) extended aeration Wastewater Treatment Plant (WWTP) was constructed shortly after CSD was formed.

In the 1980's, a modification to the Clean Water Act required 80% removal of Biological Oxygen Demand (BOD). Due to the heavy industrial flow percentage being treated by the plant (approximately 95% of the total flow), this requirement would have been extremely difficult and expensive to meet. Therefore, the District and Cone Mills jointly agreed to change the operating permit from the Cliffside Sanitary District to Cone Mills. However, CSD was to retain ownership of all facilities and remain intact. As part of this agreement, Cone Mills operated the facilities for a fee of $1 per year. Additionally, they hired all of the operators and staff necessary to operate the utility systems. This arrangement met the need of both Cone Mills and CSD.

In 1995, Cone Mills constructed a new facility, the Jacquard Plant, adjoining the Weave Plant. This new facility was also connected to CSD's utilities. Additionally, in 1995, the water treatment plant was shut down and CSD began purchasing bulk water from Duke Power Water System (which was sold to Broad River Water Authority in 2003). CSD transferred ownership of its water distribution system to the Broad River Water Authority in 2002 resulting in it only owning and operating the WWTP and the sewer collection system.

In 2003, the four Cone Mill plants were discharged a combined capacity of approximately 465,000 gallons per day of flow into the District's WWTP. Each plant's discharge volume was as follows:

Old Cliffside Mill	300,000 gallons per day
Haynes Plant	50,000 gallons per day
Weave Plant	100,000 gallons per day
Jacquard Plant	15,000 gallons per day

The overall volume discharged into the District during this time was approximately 485,000 gallons per day. The additional 20,000 gallons per day resulted from 66 residential users, ten institutional users (including two schools and three churches), five commercial users, and three small industrial facilities. Due to these insignificant flow rates, and since Cone Mills provided all necessary operational revenue, each of these small customers was charged a flat fee of $7.50.

The Old Cliffside Mill was shutdown in December of 2003, removing the vast majority of flow from the District. However, due to the prior agreement between Cone Mills and CSD, CSD would continue to function as a self sustaining entity and meet its financial commitments. In 2005, the last two Cone Mills plants shutdown eliminating the majority of the remaining industrial flow. Additionally, the operation and maintenance team, who were all employees of Cone Mills, were no longer funded by Cone Mills. The District was left with a nominal flow of 20,000 gallons per day of flow into a 1.75 MGD WWTP and nearly its entire revenue stream eliminated. The Jacquard Plant was purchased by another textile

entity and a portion of it was placed back in operation. This provided approximately 10,000 gallons per day of flow to the system.

In order to deal with this situation, the District had to address three specific items:

1. The WWTP operation would have to be modified since it could no longer operate as an extended aeration facility and the permit would have to be changed back to the District's name.
2. Additional revenue would have to be identified.
3. A new arrangement would have to be made for system operations and maintenance.

After the shutdown, the District proceeded to identify the best means of operating the WWTP in a manner sufficient to meet the current discharge limits with the significantly reduced flow in what was now an oversized plant. It was determined that that WWTP should be operated as a facultative lagoon. Additionally, due to the dramatically reduced flows, one clarifier and one filter were taken offline. Seven 10 HP aerators were installed for odor control. Only two of these are still operational. These two aerators are in continuous use.

Another action taken after the shutdown was to adjust the sewer rates. The rates went from a flat $7.50 per month per customer to a standard customer and volume charge. To assist with necessary annual adjustments, the District decided to have the sewer rates match the water rates established by the Broad River Water Authority each year. The Broad River Water Authority also began providing billing and collection services since they provided water to the same customers. These monthly rates were initially as follows:

Residential: $17.00 customer charge (flat rate) plus an additional $3.91 per 1000 gallons used

i.e. a typical homeowner using 5000 gallons per month paying $36.55 monthly for sewer use or a combined rate of $73.10 for both water and sewer ($877.20 combined annual charges). The rates have necessarily continued to increase over time.

The rates are now:

Residential	$23.50 customer charge	$4.65 per 1000 gallons used
Commercial	$107.35 customer charge	$4.65 per 1000 gallons used
Institutional	$268.40 customer charge	$7.50 per 1000 gallons used
Industrial	$536.75 customer charge	$7.50 per 1000 gallons used

There is a reducing block rate established that only affects industrial users with larger flows (>100,000 gallons per month). These rates result in a typical homeowner using 5000 gallons per month paying $46.76 monthly for sewer use or a combined rate of $93.50 for water and sewer ($1122.00 combined annual charges). Using the Median Household Income for Rutherford County, the combined water and sewer rates equate to 3.6% of the Median Household Income.

Finally, in order to provide certified operators, CSD contracted with Harris Septic Tank to operate and maintain the system. This arrangement has worked very well for CSD.

III. EXISTING SEWER SYSTEM

The existing sewer system consists of the following components:

A. 29,500 linear feet eight, ten and twelve inch gravity collection lines
B. Two lift stations
C. A wastewater treatment plant (WWTP)

A. Gravity Collection System

The original gravity collection system was installed in the 1950's. This portion of the system served the old Cliffside mill and the small village and community surrounding the mill and consisted of 8-inch Vitrified Clay Pipe (VCP). In the 1970's, Cone Mills extended service to the weave plant located northwest of the old Cliffside mill. As part of the project, almost all of the 8-inch VCP through the old Cliffside mill site was replaced with 12-inch cast iron pipe (CIP). Currently, the system consists of the following line sizes and materials:

18,222.2 linear feet of 8-inch VCP
4,147.4 linear feet of 10-inch CIP
6,431.8 linear feet of 12-inch CIP
492.8 linear feet of 10-inch concrete pipe
155 Manholes

A system map and photos of various manholes can be seen in Appendix A. Photos show manholes in the older portion of the collection system line are brick and in need of replacement. The manholes in the newer portion of the system are concrete and are in reasonably good shape.

B. Lift Stations

1. Haynes Lift Station

The Haynes Lift Station is located southwest of Highway 221A and Ellenboro/Henrietta Road intersection behind Haynes Memorial Baptist church. This lift station was converted from a small wastewater treatment plant in the 1980's. A small aeration basin that was a part of the plant is still in operation. Two small aerators are still operated for odor control. The lift station is serviced by two Gorman Rupp T-4 25 Hp suction lift pumps. A 75 KW diesel generation provides emergency power. This lift station originally provided service to the Cone Mills-Haynes Plant. Currently, there are three users discharging into this station.

User	Avg Daily Flow (gpd)
Thomas Jefferson Classical Academy	1,925
Haynes Memorial Baptist Church	65
Holland Furniture Company	90
Total	**2,080**

The design capacity the pumps is 210 gpm. This equates to a daily capacity of approximately 75,000 gallons per day (gpd). The lift station discharges via 6-inch force main to the gravity collection system in a manhole located at the new Jaquard plant. Appendix B contains photos and a schematic of this lift station.

2. Bridge Lift Station

The Bridge Lift Station is located underneath the Highway 221A bridge at the Second Broad River. All flow from the District Collection System flows into this lift station. Flow is then pumped via a 10-inch force main to the Wastewater Treatment Plant.

This lift station has two Gorman-Rupp T8 75 Hp suction lift pumps. The pumps and electrical equipment are housed in a small building. The pumps are located just below the floor of the building. Flow enters the wetwell after flowing through a bar screen. The wetwell is 12 feet in diameter and 30 feet deep. A 200 KW diesel generator provides emergency power. The design capacity of the pumps is 1400 gpm. This equates to a daily capacity of 2.0 MGD (unpeaked) for continuous industrial flow or 500,000 gpd for commercial and residential flow only. Appendix B contains photos and a schematic of this lift station.

C. Wastewater Treatment Plant (WWTP)

The wastewater treatment plant (WWTP) was installed at its current site in the mid-1970's. Prior to construction, all wastewater flow (which consisted primarily of industrial flow) discharged directly into the Second Broad River. Due to the large flow volume fluctuations from industrial production variations, the plant was constructed larger than what is typically necessary for expected flow volumes. The plant was constructed as an extended aeration treatment process consisting of headworks, a large aeration basin, clarifiers, chlorination and filters (for color removal). Appendix C contains photos and a schematic of the WWTP.

Inlet flow to the plant is via a 10-inch DIP force main from the Bridge Lift Station. This flow discharges into a receiving manhole located near the end of the plant access road. Flow then gravity flows to the headworks, which consists of a grit removal chamber and a rapid mix tank for pH adjustment. Flow then is directed into the aeration basin through three separate lines.

The aeration basin is 16 feet deep and has a surface area of 64,375 square feet and a capacity of 7,700,000 gallons. At an inflow rate of 0.5 MGD, the detention time is 15.5 days and at 1.0 MGD, the detention time is 7.7 days. Originally, there were thirteen 40 horsepower (HP) aerators located throughout the basin. These aerators were removed by Cone Mills upon the plant shutdown. Currently, two-10 HP aerators are operated for odor control purposes only. The wastewater then gravity flows through either of two outlet weirs and then to one of two clarifiers.

Each clarifier is 74 feet in diameter by 14' deep. This equates to a holding capacity of just over 400,000 gallons per clarifier. Each clarifier has a detention time of approximately 20 hours at 0.5 MGD flow. Flow is discharged from the clarifiers to a flocculation basin, and then through a sand filter for color removal before entering the

150,000 gallon chlorine contact chamber. Flow then exits to the Second Broad River via an 18 inch VCP outfall line. The WWTP discharge limits are shown in Appendix D.

IV. INFLOW & INFILTRATION ANALYSIS

A. Current Flow

Estimations have been provided on the WWTP flow breakdown as recommended. See Table 1 below for current residential, commercial, institutional and industrial flow for the time period of January 2009 to December 2009. The values were based on water billing records minus 10% consumptive loss.

Table 1: Current Flow Based on Water Billings

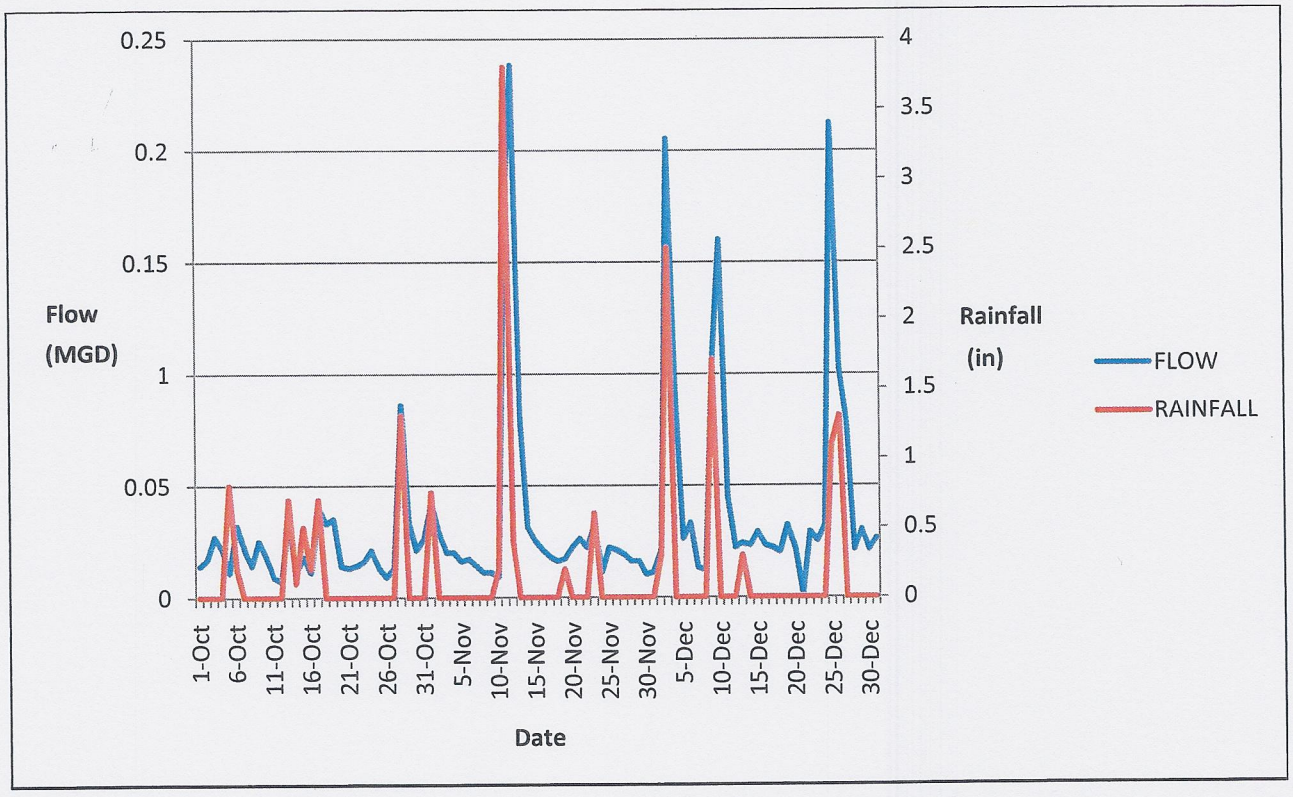
	Average Daily Usage (MGD)	Minus Consumptive Losses (MGD)
Residential (66)	0.0069	0.0062
Commercial (5)	0.0007	0.0006
Institutional (10)	0.0060	0.0054
Industrial (3)	0.0087	0.0073
Total	**0.0223**	**0.0201**

Note: The average metered flow into the WWTP from the Daily Flow Tracking form is 0.0235 MGD.

B. Inflow Analysis

Inflow was estimated using flow records from a one-inch rain event. There were five (5) dry days preceding December 25, 2009 when there was 1.1 inch of rainfall. The non-industrial peak flow at the WWTP was 203,000 gpd which does exceed the recognized standard at 275 gpd per capita served by a factor of four. (The population served of 165 persons was obtained using the number of residential customers billed with an estimated 2.5 persons per dwelling.) This system has significant inflow. The chart below compares the daily flows with daily rainfall.

October-December WWTP Flow Compared with Rainfall



This Chart indicates a direct correlation between rainfall events and flow spikes into the WWTP.

C. Infiltration Analysis

Infiltration was determined using the average daily flow of the three wettest consecutive months minus the expected flow. The three wettest consecutive months were October – December 2009 with a total rainfall of 17.65 inches. The average daily flow during these months was 0.0235 MGD. The expected flow based on water billings minus 10% equals 0.0211 MGD. Using these values, the infiltration is calculated in the following manner: (35,070 average daily wettest gpd – 21,100 average daily expected gpd)/[(4.11)(8" line) + (0.42)(10" line) + (1.05)(12" line)] = 280 gpd/in-mile (gallons per day per inch-mile). Infiltration greater than 3,000 gpdim is considered excessive; therefore the gravity collection system does not experience excessive infiltration.

V. Projected Area Growth

Growth in this portion of Rutherford County has been very slow. No specific census data is available for this area but a review of the customer list indicates a growth from 2005 to 2010 of approximately one customer per year. This equates to a growth rate of 1.25% per year for this area.

In order to determine the population having service from the system, some assumptions will have to be made. First, due to the size of the houses, 2.5 residents per home will be assumed. Currently, there are 66 homes which results to a residential population being served by the system of 165 individuals. It is assumed that the residential base and sewer flow will grow at 1.25% per year.

Residential Customer	2009 Usage (Gallons)	2029 Projected Customers	2029 Projected Usage (Gallons)
66 Homes	**2,532,000**	85 Homes	**3,246,024**

The projected Average Daily Flow for all residential customers in 2029 is 0.009 MGD.

The non-school transient population consists of the church facilities, two government facilities, and six commercial facilities, and three industrial facilities. Two of these facilities reflected zero use. These are newly active customers so an assumption has been made for their projected use. The remaining customers are projected to grow at 1.25% per year as shown below.

Non-School Transient Customer	2009 Usage (Gallons)	2029 Projected Usage (Gallons)
Masonic Lodge	4,000	5,128
Ruth. Co Rescue Squad	0	36,000
Cliffside Baptist Church	1,000	1,282
Haynes Memorial Bapt Ch	23,000	29,486
CBC Fellowship Bldg	41,000	52,562
Cliffside Post Office	3,000	3,486
Broad River Area Medical	21,000	26,922
Holland Furniture Co	5,000	6,410

McKinney Landreth Funeral	33,000	42,306
Dollar General	0	150,000
Swinging Pig Restaurant	184,000	235,888
Cone Mills Corp	3,048,000	3,907,536
Cliffside Mills LLC	54,000	69,228
Centex Pix LLC	67,000	85,894
TOTAL	**3,484,000**	**4,617,488**

The projected Average Daily Flow for non-school transient customers in 2029 is 0.013 MGD.

The two schools will experience faster growth than the commercial, industrial, and residential growth rate. Thomas Jefferson Classical Academy (TJCA) has built a new high school and is continuing to attract students at a rate consistent with the last two years. Over the last two years, TJCA has increased its water usage from 564,000 gallons to 703,000 gallons (11.6% annual increase). Cliffside Elementary School has seen an increase from 1,005,000 gallons to 1,376,000 gallons (17% annual increase). Since these high growth rates will likely reduce over time, a projected growth rate of 10% per year will be assumed.

School Transient Customers	**2009 Usage (Gallons)**	**2029 Projected Usage (Gallons)**
Cliffside Elementary Schools	1,376,000	9,257,039
Thomas Jefferson Classical Academy	703,000	4,729,432
TOTAL	**2,079,000**	**13,986,471**

The projected Average Daily Flow for school transient customers in 2029 is 0.038 MGD.

Currently, the Sanitary District covers a very small area (see attachment 1). Many of the sewer customers are outside of the District. Additionally, the surrounding community consists of areas with small lots and older homes that would benefit from sewer service.

To address these concerns as well as assist with additional revenue and a larger pool of potential commissioners, it is anticipated that the District will be expanded beyond its current boundaries. These new customers will be primarily residential and small commercial customers. Therefore additional 20,000 gallons pre day (0.020 MGD) of capacity is reserved for this potential.

Therefore the total projected 20 year demand (2029) for the Cliffside Sanitary District is 80,000 gallons per day (0.080 MGD).

VI. SANITARY DISTRICT MANAGEMENT AND EXPANSION

a) District Management: The sanitary district board is composed of three members. No candidates filed to run in the 2008 election essentially leaving the District without a governing body. The prior chairman of the board has continued to serve in that same capacity currently to provide management and oversight. North Carolina General Statues are very specific about how Sanitary District Boards are to be selected. North Carolina General Stature 130A-50(b) states:

"The sanitary district board shall be composed of either three or five members as the country commissioners in their discretion shall determine. The members first appointed shall serve as the governing body of the sanitary district until the next regular election for municipal and special district officers as provided in G.S 163-279, which occurs more than 90 days after their appointment. At that election, their successors shall be elected. The terms of the members shall be for two or four years and may be staggered as determined by the county board of commissioners so that some members are elected at each biennial election. The members of the sanitary district board shall be residents of the district. The county board of commissioners shall notify the county board of elections of any decisions made under this subsection."

This statute limits the flexibility to appoint board members who own property in the District but reside outside the District. Special Legislation would be required to provide this as an option for expanding the pool of potential board members. NC GS 130A-54 states:

"Any vacancy in a sanitary district board shall be filled by the county commissioners until the next election for sanitary district board members. If the district is located in more than one county, the vacancy shall be filled by the county commissioners of the county from which the vacancy occurred."

The current vacancies can be filled by appointment by the county commissioners but they must be residents of the District itself.

b) District Expansion: The current size of the District is very small (See Appendix C). It has not been expanded since its inception. Some of its customers are outside the District's boundaries. In order to treat all customers fairly, the District's boundaries should be expanded. Appendix E shows a proposed boundary expansion that ensures all current customers are within the District. The North Carolina General Statutes are very specific regarding the process to expand a Sanitary District's boundaries. General Statue 130A-69 (included in Appendix L) details this procedure. Specifically, a petition signed by at least 15% of the residents of the proposed expansion area requesting annexation starts the process. /this is followed by an election whereby the majority of voters of the proposed expansion area must agree to expand the district into their area before such an expansion can occur. It is recommended that an effort be made to expand the District to the boundaries shown in Appendix E. Should this effort prove unsuccessful, a separate rate structure should be established for consumers outside the District boundaries to offset the potential revenue loss due to the District boundaries not being expanded.

VII. NEEDS ANALYSIS

Four areas need to be addressed to ensure the long term viability of the District and its ability to continue to provide sewer service to its customers:

A. The gravity collection system
B. The bridge lift station
C. The wastewater treatment plant
D. The budget deficit

A. Gravity Collection System

The gravity collection system primarily consists of two sections; the section of the system installed in the 1950's and the sections installed in the 1970's and 1980's. The older section of the system needs replacing. The smoke testing results (Appendix G) on the older section showed a lot of areas needing repair. The manholes on this section of the system are brick and need replacing. Additionally, some of the line is underneath structures and is difficult to access. It is recommended that all of this line be replaced and relocated to the road right of way where feasible. There is also a section of line going through the old Cliffside mill that is concrete. This section of line was not replaced due to its potential impact upon the production schedule of the mill since it is located underneath the primary access way through the mill. This line should be replaced with 12-inch DIP. The cost estimate for repairing the gravity collection system is shown in Appendix H. The newer section is almost all cast iron pipe and is in good condition. The manholes are concrete and do not need replacement.

B. Bridge Lift Station

The bridge lift station is shown in Appendix B. This lift station was originally constructed in the 1970's. The existing Gorman-Rupp T8 pumps and control equipment are in good condition. Given the existing flow, the current pump capacity of 1400 gpm is unnecessarily high. The current average daily flow under dry conditions is approximately 30,000 gallons per day. The peak flow from 2009 was 238,000 gallons per day. This peak flow occurred in November the day after a 4-inch rain event. If these 238,000 gallons were distributed evenly over a 24-hour period, the flow would equate to 165 gallons per minute. The lift station could be reduced in size to a 200 gpm lift station under peak conditions. This would allow a reduction in the force main size to 6-inches. Additionally, the building and grounds have various maintenance needs. The recommended costs are identified in Appendix J.

C. Wastewater Treatment Plant

As previously discussed, the WWTP is currently functioning as a facultative lagoon. This operational technique was chose due to the excessive size of the WWTP components as compared to the current average daily flow being treated. At this time, the WWTP is successfully treating the flow to meet the current discharge limits (which are shown in Appendix D). This success is largely attributable to the fact that the WWTP is classified as an industrial system. If, however, the largest industrial user were to cease discharging into the system, the discharge limits would be modified to the removal of 85% of the incoming Biological Oxygen Demand (BOD) and 85% of the incoming Total Suspended Solids (TSS). Therefore, a long-term solution needs to be established that will allow this removal rate to be achieved.

There are several different options available to address need. These include but are not limited to:

1. Modification of existing WWTP.
2. Package Treatment Plant.
3. Pump flow to the Town of Forest City.
4. Pump flow to the Town of Boiling Springs.

Each option is explored in the following discussion.

1. Modification of existing WWTP

This option would involve a modification to the WWTP as recommended by the Technical Assistance Report completed for the District by Don Price, CET of NCDWQ. Specifically, the existing lagoon would be modified by the installation of berms to create three separate, series connected lagoons. This would allow a more traditional partial mix lagoon treatment process and would enable the WWTP to meet predicted future discharge limits. A diffused air system would be placed in the initial cell for mixing and to increase the oxygen concentration to 2.0 mg/l. An oxygen probe will be utilized to limit energy consumption. Additionally, a septage receiving station with induced air flotation will be installed prior to the headworks of the WWTP to allow for some removal of fats an solids as well as to add oxygen. Finally, the chlorine feed system would be modified to feed directly into the new 18-inch line going into the chlorine contact chamber. The access road to the existing WWTP is has some failures in the fill slope creating cracks in the asphalt road. The access road will need to be repaired to ensure continued access into the WWTP. A schematic of the recommended changes and the cost estimate is shown in Appendix J - 1. The estimated cost for this option is $610,000.

Advantages

- Cost effectiveness
- Effective treatment
- Proven technology
- Expandable to original capacity
- Reduced operating costs based upon an efficient design for the flow to be treated

Disadvantages

- NPDES permit would remain in place which could limit funding opportunities
- Licensed operator required

2. Package Treatment Plant

This option would involve the installation of a package treatment plant at the existing plant location and abandoning the remaining unused components of the existing WWTP. The existing Bridge Lift Station would need to be modified based upon the current flow rate as recommended in the previous section. The access road to the WWTP will need to be modified as discussed above. The cost for this option is shown in Appendix J.

Advantages

- Would provide a long life as all of the components would be new
- Effective treatment
- Proven technology
- Components of the existing WWTP could remain in place in case industrial flow were to return
- Reduced operating costs based upon an efficient plant design for the flow to be treated

Disadvantages

- Expensive
- High I&I flow could create operational challenges resulting in the inability to meet discharge limits
- NPDES permit would remain in place which could limit funding opportunities
- Licensed operator required

3. Pump Flow to the Town of Forest City

This option would involve the abandonment of the existing WWTP and the modification of the existing Bridge Lift Station to pump the flow to the Town of Forest City. A WWTP closure process would be followed in accordance with NC DENR requirements. The access road would not need to be repaired and the land could be reclaimed for other uses. A licensed operator would not be required unless the flow reached 75,000 gpd, however, the District would incur sewer charges for discharge into the Town's sewer system. The NPDES permit would be voided. The cost of this option is shown in Appendix J.

Advantages

- More funding sources due to the elimination of an NPDES permit
- No licensed operator required
- Simple and reliable technology
- Elimination of all testing

Disadvantages

- Expensive
- High I&I flow could overwhelm lift station in severe storm events
- Overall operation costs increase due to sewer charges
- Limited supervisory involvement by eliminating licensed operator
- Ability to re-obtain NPDES permit is limited or unlikely effectively eliminating the system as a treatment option for larger industrial flow
- Long detention time in force main creating septic flow resulting in treatment challenges at Forest City WWTP and odor concerns

4. Pump Flow to the Town of Boiling Springs

This option would involve the abandonment of the existing WWTP and the modification of the existing Bridge Lift Station to pump the flow to the Town of Boiling Springs. A WWTP closure process would be followed in accordance with NC DENR requirements. The access road would not need to be repaired and the land could be reclaimed for other uses. A licensed operator would not be required unless the flow reached 75,000 gpd, however, the District would incur sewer charges for discharge into the Town's sewer system. The NPDES permit would be voided. The cost of this option is shown in Appendix J.

Advantages

- More funding sources due to the elimination of an NPDES permit
- No licensed operator required
- Simple and reliable technology
- Elimination of all testing

Disadvantages

- Expensive
- High I&I flow could overwhelm lift station in severe storm events
- Overall operation costs increase due to sewer charges
- Limited supervisory involvement by eliminating licensed operator
- Ability to re-obtain NPDES permit is limited or unlikely effectively eliminating the system as a treatment option for larger industrial flow
- Long detention time in force main creating septic flow resulting in treatment challenges at Boiling Springs WWTP and odor concerns. This option is not as severe as the Town of Forest City option.

The next section of this report evaluates the Net Present Worth of each option to assist in the selection of a recommended alternative.

5. Present Worth Analysis of Wastewater Treatment Plant Options

The following table provides a present worth analysis of the Wastewater Treatment Plant options.

		Option 1- Modification of existing WWTP	Option 2 – Package Treatment Plant	Option 3 – Pump to Forest City	Option 4 – Pump to Boiling Springs
Step:					
1	**Capital Costs:**				
	Materials, Construction, & Installation	$500,000	$580,000	$1,335,000	$868,000
	Engineering	$35,000	$44,660	$102,795	$66,836
	Admin & Inspection	$25,000	$31,900	$73,425	$47,740
	Contingencies	$50,000	$58,000	$133,500	$86,800
	Total Capitalized Costs:	$610,000	$714,560	$1,644,720	$1,069,376
2	**Operation & Maintenance:**				
	Utilities	$22,700	$22,700	$20,000	$17,000
	Licenses	$7,000	$7,000	$0	$0
	Lake Testing	$7,000	$7,000	$0	$0
	Lake Supplies	$500	$500	$0	$0
	Contract Operator	$52,000	$52,000	$30,000	$30,000
	Chemicals	$3,000	$3,000	$0	$0
	Sewer Charges	0	0	$35,000	$35,000
	20 Year total (2.5% Annual Inflation:	$2,470,168	$2,470,168	$2,171,296	$2,094,662
3	**Present Worth:**	$3,080,168	$3,184,728	$3,816,016	$3,164,038
4	**Salvage Value**				
	Est 50 yr life, using straight line depreciation				
	Est Salvage Value after 20 years				
	Single Payment present worth factor				
	Present Worth of Alternative	$3,080,168	$3,184,728	$3,816,016	$3,164,038

As can be seen from the above chart, the lowest Net Present Value Project is the Modification of the existing WWTP. This option also provides the District with the most flexibility for future industrial discharges by keeping the NPDES permit in place and allowing the majority of the plant components to stay in place and intact. Therefore, the recommended option is to modify the existing WWTP.

D. Budget Deficit

As mentioned previously, the District primarily relied upon Cone Mills to provide nearly all of the necessary operating revenue for most of its operating life. Once Cone Mills closed down, substantial rate increases plus a supplement from Rutherford County were necessary to allow continued operations. The current fiscal year budget is show below.

REVENUE	CURRENT FISCAL YEAR BUDGET
Prior Year Tax Collections	$90
Local Sales Tax Revenue	$4,640
Property Tax	$1,327
Sewer Revenue	$89,350
Interest Income	$50
New Connections	$500
Fund Balance Appropriated	$10,000
County Supplement	$61,296
Total Revenue	**$167,253**
EXPENSES	
Utilities	$50,200
Phone	$1,400
Sewer and Utility Maintenance and Repairs	$28,000
Legal and Accounting	$3,500
Insurance	$5,665
Office Supplies and Postage	$300
Back Fees	$160
Licenses	$7,000
BRWA – Sewer Billing	$640
Lab Testing (Pace)	$7,000
Lab Supplies	$500
Harris – Monthly Operations	$51,600
Grounds Maintenance	$4,500
Chemicals	$2,000
Misc.	$4,788
Total Expenditures	**$167,253**

Due to a budget shortfall in the 2008/2009 fiscal year, Rutherford County increased its supplement from $55,000.00 to $ 61,296.00 for the current fiscal year. However, the District's finances are still insufficient to be able to stay current on its operating expenses, much less have funding in place for equipment repairs. Currently, there is an immediate need for funds to repair a flow meter, yet no revenue is available. As of May 2010, the bank balance is approximately $5,000 (with approximately $10,000 in a savings account). However, the District owes the contractor that operates the system four months of back pay.

In order to address this issue, a combination of spending reductions plus revenue increases must be undertaken. Additionally, a Capital Reserve Fund should be established for emergency and planned repairs. A summary of a revised proposed budget is shown below that accomplishes these goals as well as eventually reducing the County supplement.

REVENUE	CURRENT FY	REVISED	
Prior Year Tax Collections	$90		$90
Local Sales Tax Revenue	$1,327		$1,310
Property Tax	$4,640	*(1)*	***$11,000***
Sewer Revenue	$89,350		$92,000
Interest Income	$50		$100
New Connections	$500		$500
Fund Balance Appropriated	$10,000	*(4)*	***$0***
County Supplement	$61,296	*(4)*	***$12,700***
Total Revenue	**$167,253**		**$117,700**
EXPENSES			
Utilities	$50,200	*(2)*	***$22,700***
Phone	$1,400		$1,500
Sewer and Utility Maintenance and Repairs	$28,000	*(3)*	***$0***
Legal and Accounting	$3,500		$3,500
Insurance	$5,665		$5,500
Office Supplies and Postage	$300		$300
Back Fees	$160		$0
Licenses	$7,000		$7,000
BRWA – Sewer Billing	$640		$700
Lab Testing (Pace)	$7,000		$7000
Lab Supplies	$500		$500
Harris – Monthly Operations	$51,600	*(5)*	$52,000
Grounds Maintenance	$4,500	*(5)*	$0
Chemicals	$2,000		$3,000

Misc.	$4,788		$2,000
Capital Reserve Fund	$0	*(3)*	***$12,000***
Total Expenditures	**$167,253**		**$117,00**

(1) The current size of the District is very small (See Appendix C). It has not been expanded since its inception. Some of its customers are outside the district boundaries. In order to treat all customers fairly, the District's boundaries should be expanded. Appendix E shows a proposed boundary expansion that ensures all current customers are within the District. Additionally, the tax rate should be increased from $0.08 per $100 valuation to $0.10 per $100 valuation. Both of these adjustments would increase the tax revenues to $11,000 per year.

(2) The current utility bills for the District do not match the level of demand. The District has six separate power meters with Duke Power. These are shown in the table below with the annual power costs.

METER SERVICE	ANNUAL POWER COST
Haynes Lift Station	$4,400
Haynes Lift Station Aerators	$700
Street Light for Haynes Lift Station	$300
Hawkins Loop Road Light	$300
Bridge Lift Station	$7,000
WWTP	$37,500
TOTAL	**$50,200**

The WWTP meter currently provide electric service to the operations building power, (lights, heat, computers) the sludge pump (rarely used), and the clarifier and the filter building. Currently, aeration is provided by continuously operating two 10 HP aerators in the aeration basin. The clarifier has one 5 HP gear motor. Finally, there are two small 1-2 HP loads in the filter building. This should equate to an annual power bill of approximately $12,000 per year. However, the District is paying $37,500 per year for this service. This large discrepancy is due to a large minimum bill being charged by Duke Power based upon the transformer size. A request has been made to Duke Power to replace the transformer or significantly reduce the minimum bill based upon the small load. The proposed modification to the Bridge Lift Station will reduce its utility cost also. By reducing the

pumps from 1400 gpm to 200 gpm, the annual utility costs for the Bridge Lift Station meter will drop to $5000.

(3) The sewer and utility maintenance Repairs line item was deleted. It is partially replaced by a Capital Revenue Fund. No additional significant maintenance is recommended due to the initial large capital project for the first five years from the project's completion.

(4) The fund balance contribution has been deleted. Additionally, the county's contribution was reduced to $12,700. If the District boundary is modified and the Duke Power request has been completed (and the projected savings materialize), this reduction can be in place for the 2011/2012 budget year. Due to the schedules rate increase proposed by BRWA, it is anticipates that the contribution necessary from Rutherford County with approach zero by FY 2016/2017.

(5) It is recommended that a long term contract be negotiated with Harris Septic Tank. This contract should include grounds maintenance.

VIII. ENVIRONMENTAL ASSESSMENT

a) Existing Environment: The Cliffside Community is a small unincorporated area located in southeastern Rutherford County. The area used to be home to several textile facilities operated by cone mills. This area also has two schools, a small commercial area and approximately 150 densely located homes. This area also has not experienced extensive development over the last decade. The topography is mildly rolling with slopes generally in the 2%-10% range. There is a high groundwater table in the low areas with several small streams and the second broad river flowing throughout the area. The predominant soil types in this area are of the Cecil Series and the Bethlehem-Pacolet Series. These soils consist of a loamy surface layer with clayey subsoil. There are several visible rock formations along the river.

b) Need: This project involves the replacement of existing gravity sewer lines and the modification to one sewer lift station and the Wastewater Treatment Plant. These projects are being completed to reduce I&I, to reduce operating costs and to be in a position to meet more stringent discharge limits. Without this project, the viability of the district is in question.

c) Alternatives Analysis: The previous two sections discussed the various alternatives. The recommended option is the modification of the existing WWTP.

d) Environmental Consequences:

i. Changes in land use: The lift stations and force main and the gravity line extension will not directly result in any change in land use. The likely use of the land is residential and commercial and the proposed project will have no impact upon this use. New line alignment will utilize NCDOT rights of way.

ii. Wetlands and floodplains: There are no new impacts on wetlands and floodplains.

iii. Prime or unique agricultural lands: The project will have no impact on prime or unique agricultural lands.

iv. Scenic and recreational areas: The project will have no impact on scenic and recreational areas.

v. Area of archeological or historical value: This project has no impact to property with archeological or historical value.

vi. Air quality: The project will have no impact on air quality. Odor control has been considered during the design process.

vii. Groundwater quality: The project will have no impact on ground water. The project will positively impact groundwater quality as new sewer customers connect to the system and abandon currently used septic systems.

viii. Nuisance conditions: The lift station is located next to a road intersection where there is no concern of excessive noise. Odor control has been considered during the design process.

ix. Water supplies: The project will have no impact on water supplies.

x. Shellfish or fish and their habitats: The project will have no impact on shellfish or fish and their habitats.

xi. Wildlife and their habitats: The project will have no impact on wildlife and their habitats.

xii. Introduction of toxic or hazardous substances: The project will have no impact on the introduction of toxic or hazardous substances.

xiii. Receiving waters: The project will have no impact on receiving waters.

xiv. Indirect or secondary impacts: Minor due to the development of the property itself. Considered acceptable by local government.

e) Mitigation Measures: No mitigation measures are necessary due to the minor nature of the adverse environmental impacts.